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10/581,859	06/05/2006	Shigeto Kajiwara	127991	4641

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EXAMINER	
NYTKO-LUTZ, EMILY	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/581,859	KAJIWARA, SHIGETO	
	Examiner	Art Unit	
	EMILY NYTKO-LUTZ	4133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20060605, 20080514, 20080624*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

- [0020]/L2 “a fuel call” should read “a fuel cell”.
- [0049]/L10 “adds" should read "add".

Appropriate correction is required.

Claim Objections

2. Claim 30 is objected to because of the following informalities: “The hybrid fuel cell system according to any one of claim 27…” should read “the hybrid fuel cell system according to claim 27”.

Appropriate correction is required

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kazama (US 2003/0094816).

Regarding claim 15, Kazama discloses a hybrid fuel cell system ([0036]/L5-10), comprising:

- a fuel cell (Fig. 1, “electric power generator” (101), [0036]/L6-7, [0037]);
- an electric power storage device (“electric power storage unit” (103), [0037]);

- a load portion which consumes electric power ("vehicle drive motor" (104), [0037]); and
- a control portion which controls an amount of electric power consumed by the load portion ("controller" (105), [0041]/L8-17, [0043]/L1) based on a difference between a supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0043]/L12-19 "*available* electric power output PO of the electric power storage unit (103) to be available on the basis of the state of charge of the electric power storage unit (103) which is based on the discharge current BI, the battery charge voltage BV or the like"),
- wherein the control portion changes the amount of electric power consumed by the load portion ("controller (105) operates to calculate a target amount of electric power to be produced…for producing a command signal C3 which is applied to the vehicle drive motor (104) for controlling drive power of the drive wheels (106)." [0041]).

Regarding limitations in said claim directed to the manner of operating the control portion, i.e., "changes the amount of electric power consumed by the load portion so as to reduce the difference between the supply electric power set value indicating an amount of electric power which needs to be supplied from the electric storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied by the electric power

storage device", it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 16, Kazama discloses all the claim limitations as set forth above, and further discloses the control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") based on at least a supply electric power set value indicating an amount of electric power which needs to be supplied from the fuel cell ([0067]/L1-7) and a consumption electric power set value indicating an amount of electric power which needs to be consumed by the load portion ("demanded drive power DP" [0046]) ([0055]-[0056] describe how the power needed by the system consists of the sum of the demanded drive power of the load and accessories, [0066]-[0067] detail how the power provided by the electric power generator is related to the available and allowable power output of the battery). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art.

See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 17, Kazama discloses all the claim limitations as set forth above, and further discloses the load portion includes a system accessory (accessory unit (200), [0045]/L3-6, [0054]-[0055]), and the control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device, using the consumption electric power set value including an amount of electric power consumed by the system accessory ([0055]-[0059] Allowable drive electric power output PA is calculated from P', the total power needs of the system including the accessories.). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 18, Kazama discloses all the claim limitations as set forth above, and further discloses the hybrid fuel cell system, wherein the load portion includes a drive motor ("vehicle drive motor" (104)), and the control portion controls an amount of electric power consumed by the drive motor based on the difference between the supply electric power set value

indicating an amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0058]-[0059). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 19-22 & 27-30 are rejected under 35 U.S.C. 103(a) as obvious over Kazama (US

2003/0094816) in view of Okhubo et al. (EP 1 220 413).

Regarding claim 19, Kazama discloses a hybrid fuel cell system ([0036]/L5-10), comprising:

- a fuel cell (Fig. 1, "electric power generator" (101), [0036]/L6-7, [0037]);
- an electric power storage device ("electric power storage unit" (103), [0037]);
- a load portion which consumes electric power ("vehicle drive motor" (104), [0037]); and
- a control portion which controls an amount of electric power consumed by the load portion ("controller" (105), [0041]/L8-17, [0043]/L1) based on a difference between a supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0043]/L12-19 "*available* electric power output PO of the electric power storage unit (103) to be available on the basis of the state of charge of the electric power storage unit (103) which is based on the discharge current BI, the battery charge voltage BV or the like").

Kazama further teaches that information based on the state of charge of the battery is useful [0041]. Specifically, information such as the battery's discharge current can be used in calculation by the controller of the available electric power output of the battery [0043]. Further, overcharge of the battery is a known problem in such hybrid systems and is to be avoided [0086].

Kazama does not explicitly disclose

- a filter which removes a noise component contained in the difference between the supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device and which outputs the difference with the noise component removed to the control portion,
- wherein the control portion changes the amount of electric power consumed by the load portion so as to reduce the difference with the noise component removed.

Okhubo et al. teaches a means for accurately determining charging and discharging current of a battery [0014]. Said means involves use of an integrating means or an integrator [0014], which functions as a low-pass filter. The detected current integrating means integrates the current values that are detected by a current sensor during a period from the instant a battery is fully charged to the instant it is fully charged thereafter [0014]. Because the battery should be charged and discharged by the same amount of current, the integrated value contains offset values that are caused by the current sensor [0014]. The integrated value of the detected current values is divided by the length of the period that is the integration period, thus offsetting any change in values and allowing for accurate and precise measurement of the battery capacity under different load conditions [0014].

Kazama and Okhubo et al. both concern the state of charge of an electrical storage device, i.e., a battery.

It would have been obvious to one of ordinary skill in the art at the time of the invention

to use an integrating means functioning as a low-pass filter connected to the current sensor of the electrical storage device of Kazama, for purposes of offsetting values caused by the current sensor and accurately and precisely measuring battery capacity under different load conditions (Okhubo et al. [0014]). The detected filtered current could then be used to calculate supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device ("allowable drive electric power output" PA, calculated from "available electric power output" PO according to [0058]) and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device and which outputs the difference with the noise component removed to the control portion ("Available electric power output" (PO) is based on discharge current [0043] which has been passed through a filter in modified Kazama, therefore said difference also has the noise component removed), wherein the control portion changes the amount of electric power consumed by the load portion ("controller (105) operates to calculate a target amount of electric power to be produced…for producing a command signal C3 which is applied to the vehicle drive motor (104) for controlling drive power of the drive wheels (106)." Kazama, [0041]). Regarding the limitation in said claim that the control portion changes the amount of electric power consumed by the load portion so as to reduce the difference with the noise component removed, and other limitations directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App.

1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 20, modified Kazama discloses all the claim limitations as set forth above, and further discloses the control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") based on at least a supply electric power set value indicating an amount of electric power which needs to be supplied from the fuel cell ([0067]/L1-7) and a consumption electric power set value indicating an amount of electric power which needs to be consumed by the load portion ("demanded drive power DP" [0046]) ([0055]-[0056] describe how the power needed by the system consists of the sum of the demanded drive power of the load and accessories, [0066]-[0067] detail how the power provided by the electric power generator is related to the available and allowable power output of the battery). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 21, modified Kazama discloses all the claim limitations as set forth above, and further discloses the load portion includes a system accessory (accessory unit (200), [0054]-[0055]), and the control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device, using the consumption electric power set value including an amount of electric power consumed by the system accessory ([0055]-[0059] Allowable drive electric power output PA is calculated from P', the total power needs of the system including the accessories.). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 22, modified Kazama discloses all the claim limitations as set forth above, and further discloses the hybrid fuel cell system, wherein the load portion includes a drive motor ("vehicle drive motor" (104)), and the control portion controls an amount of electric power consumed by the drive motor based on the difference between the supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0058]-[0059). Regarding limitations in said claim directed to the manner of operating the control portion, it is

noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 27, Kazama discloses a hybrid fuel cell system ([0036]/L5-10), comprising:

- a fuel cell (Fig. 1, "electric power generator" (101), [0036]/L6-7, [0037]);
- an electric power storage device ("electric power storage unit" (103), [0037]);
- a load portion which consumes electric power ("vehicle drive motor" (104), [0037]); and
- a control portion which controls an amount of electric power consumed by the load portion ("controller" (105), [0041]/L8-17, [0043]/L1) based on a difference between a supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0043]/L12-19 "*available* electric power output PO of the electric power storage unit (103) to be available on the basis of the state of charge of the electric power storage unit (103) which is based on the discharge current BI, the battery charge voltage BV or the

like");

- computing portion for changing the amount of electric power consumed by the load portion ("Controller (105) controls drive motor (104) on the basis of demanded drive power (DP)" [0045]/L16-19)

Kazama further teaches that information based on the state of charge of the battery is useful [0041]. Specifically, information such as the battery's discharge current can be used in calculation by the controller of the available electric power output of the battery [0043]. Further, overcharge of the battery is a known problem in such hybrid systems and is to be avoided [0086].

Kazama does not disclose

- a filter which removes a noise component contained in the difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device, and which outputs the difference with the noise component removed to the control portion; and
- computing portion for changing the amount of electric power consumed by the load portion so as to reduce the difference with the noise component removed.

Okhubo et al. teaches a means for accurately determining charging and discharging current of a battery [0014]. Said means involves use of an integrating means or an integrator [0014], which functions as a low-pass filter. The detected current integrating means integrates the current values that are detected by a current sensor during a period from the instant a battery is fully charged to the instant it is fully charged thereafter [0014]. Because the battery should be

charged and discharged by the same amount of current, the integrated value contains offset values that are caused by the current sensor [0014]. The integrated value of the detected current values is divided by the length of the period that is the integration period, thus offsetting any change in values and allowing for accurate and precise measurement of the battery capacity under different load conditions [0014]. Kazama and Okhubo et al. both concern the state of charge of an electrical storage device, i.e., a battery.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an integrating means functioning as a low-pass filter connected to the current sensor of the electrical storage device of Kazama, for purposes of offsetting values caused by the current sensor and accurately and precisely measuring battery capacity under different load conditions (Okhubo et al. [0014]). The detected filtered current could then be used to calculate supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device ("allowable drive electric power output" PA, calculated from "available electric power output" PO according to [0058]) and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device and which outputs the difference with the noise component removed to the computing portion ("Available electric power output" (PO) is based on discharge current [0043] which has been passed through a filter in modified Kazama, therefore said difference also has the noise component removed), wherein the computing portion changes the amount of electric power consumed by the load portion ("controller (105) operates to calculate a target amount of electric power to be produced…for producing a command signal C3 which is applied to the vehicle drive motor (104) for controlling drive power of the drive wheels (106)." Kazama, [0041]). Regarding

the limitation in said claim that the computing portion changes the amount of electric power consumed by the load portion so as to reduce the difference with the noise component removed, and other limitations directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 28, modified Kazama discloses all the claim limitations as set forth above, and further discloses the control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") based on at least a supply electric power set value indicating an amount of electric power which needs to be supplied from the fuel cell ([0067]/L1-7) and a consumption electric power set value indicating an amount of electric power which needs to be consumed by the load portion ("demanded drive power DP" [0046]) ([0055]-[0056] describe how the power needed by the system consists of the sum of the demanded drive power of the load and accessories, [0066]-[0067] detail how the power provided by the electric power generator is related to the available and allowable power output of the battery). Regarding limitations in said claim directed to the manner of operating the control

portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 29, modified Kazama discloses all the claim limitations as set forth above, and further discloses the load portion includes a system accessory (accessory unit (200), [0054]-[0055]), and the control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device, using the consumption electric power set value including an amount of electric power consumed by the system accessory ([0055]-[0059] Allowable drive electric power output PA is calculated from P', the total power needs of the system including the accessories.). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 30, modified Kazama discloses all the claim limitations as set forth

above, and further discloses the hybrid fuel cell system, wherein the load portion includes a drive motor ("vehicle drive motor" (104)), and the control portion controls an amount of electric power consumed by the drive motor based on the difference between the supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0058]-[0059). Regarding limitations in said claim directed to the manner of operating the control portion, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Claims 23-26 & 31 are rejected under 35 U.S.C.103(a) as obvious over Kazama (US 2003/0094816) in view of Tamagawa et al. (EP 1 220 413).

Regarding claim 23, Kazama discloses a hybrid fuel cell system ([0036]/L5-10), comprising:

- a fuel cell (Fig. 1, "electric power generator" (101), [0036]/L6-7, [0037]);
- an electric power storage device ("electric power storage unit" (103), [0037]);
- a load portion which consumes electric power ("vehicle drive motor" (104), [0037]);
- a first control portion for obtaining a supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device

([0043]/L4-10 "allowable drive electric power output calculating section (2) which calculates allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power"), based on a supply electric power set value indicating an amount of electric power which needs to be supplied from the fuel cell ([0043]/L8-10, the allowable drive electric power output PA compensates for the delayed response of the electric power generator (101), therefore the electric power from the electric power generator must be accounted for in the calculation) and a consumption electric power set value indicating an amount of electric power which needs to be consumed by the load portion ("variations in the demanded drive power DP" [0043]/L11 are compensated for, so these, too must be in accounted for in the calculation.);

- a difference obtaining portion for obtaining a difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ("electric power calculating section (4)" [0043]/L19-24 can inherently perform this function. [0066]-[0067] details how said difference affects the operation of electric power generator (101));
- a second control portion for controlling the amount of electric power consumed by the load portion ("drive motor control section (6)" [0045]); and

- a computing portion for changing the amount of electric power consumed by the load portion ("demanded drive calculating section (1) performs a calculation for a demanded drive power DP to the drive motor (104)" [0043]/L1-4),

Kazama does not disclose that the second control portion controls the amount of electric power consumed by the load portion based on the difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device, or that the computing portion changes the amount of electric power consumed by the load portion so as to reduce the difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device.

Tamagawa et al. teaches that it is desirable to control the upper limit of electricity supplied by a battery (upper limit of discharge) for driving a motor in a hybrid system and the upper limit of electricity of the battery charged by the motor (upper limit of charge) [0078]. Controlling the upper limit of charge protects the battery from overcharge [0040]. In order to accomplish this means, the motor controller controls torque to the motor, i.e., the amount of electric power consumed by the load portion, to not exceed the upper limits of the battery [0078].

Kazama and Tamagawa et al. are analogous prior art because both relate to the same field of endeavor, namely, control of hybrid power systems.

It would have been obvious for one of ordinary skill in the art at the time of the invention to use the drive motor control section of Kazama to control the amount of power consumed by the motor, as taught by Tamagawa et al., for purposes of protecting the battery in the circuit from overcharge. Further, it would have been obvious for one of ordinary skill in the art at the time of the invention to use the demanded drive calculating section as taught by Kazama et al. to change the amount of electric power consumed by the load portion so as to reduce the difference, again, for purposes of protecting the battery in the circuit from overcharge.

Regarding claim 24, modified Kazama discloses all the claim limitations as set forth above, and further discloses the first control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device ([0043]/L4-10 "allowable drive electric power output calculating section (2) which calculates allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") based on at least a supply electric power set value indicating an amount of electric power which needs to be supplied from the fuel cell ([0043]/L8-10, the allowable drive electric power output PA compensates for the delayed response of the electric power generator (101), therefore the electric power from the electric power generator must be accounted for in the calculation) and a consumption electric power set value indicating an amount of electric power which needs to be consumed by the load portion ("variations in the demanded drive power DP" [0043]/L11 are compensated for, so these, too must be in accounted for in the calculation.) Regarding limitations in said claim directed to the manner of operating said first control portion, it is noted that neither the manner of operating a

disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 25, modified Kazama discloses all the claim limitations as set forth above, and further discloses the hybrid fuel cell system wherein the load portion includes a system accessory (accessory unit (200), [0045]/L3-6, [0054]-[0055]), and the first control portion obtains the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device, using the consumption electric power set value including an amount of electric power consumed by the system accessory (Electric power output calculating section (2) is described as calculating the allowable drive electric power output PA of the electric power storage unit (103) ([0043]/L5-8). In [0055]-[0059], the allowable drive electric power output PA is calculated from P', the total power needs of the system including the accessories.)

Regarding claim 26, modified Kazama discloses all the claim limitations as set forth above, and further discloses the load portion includes a drive motor ("vehicle drive motor" (104)), and the second control portion controls an amount of electric power consumed by the drive motor ("drive motor control section" (6) controls the drive motor on the basis of demanded drive power DP [0045]/L16-19). Regarding the limitation that said second control portion controls an amount of electric power consumed by the drive motor based on the difference

between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 31, claim elements "first control means for obtaining…", "difference obtaining means for obtaining a difference", "second control means for controlling…," and "computing means for changing", are means (or step) plus function limitations that invoke 35 U.S.C.112, sixth paragraph. In the instant specification, "first control means for obtaining…" is positively recited as element (11), "difference obtaining means for obtaining a difference" is positively recited as element (41), "second control means for controlling…" is positively recited as element (12), and "computing means for changing" is positively recited as element (17) [0047].

Regarding claim 31, Kazama discloses a hybrid fuel cell system ([0036]/L5-10), comprising:

- a fuel cell (Fig. 1, "electric power generator" (101), [0036]/L6-7, [0037]);
- an electric power storage device ("electric power storage unit" (103), [0037]);

- a load portion which consumes electric power ("vehicle drive motor" (104), [0037]);
- first control means for obtaining a supply electric power set value indicating an amount of electric power which needs to be supplied from the electric power storage device ([0043]/L4-10 "allowable drive electric power output calculating section (2) which calculates allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power"), based on a supply electric power set value indicating an amount of electric power which needs to be supplied from the fuel cell ([0043]/L8-10, the allowable drive electric power output PA compensates for the delayed response of the electric power generator (101), therefore the electric power from the electric power generator must be accounted for in the calculation) and a consumption electric power set value indicating an amount of electric power which needs to be consumed by the load portion ("variations in the demanded drive power DP" [0043]/L11 are compensated for, so these, too must be in accounted for in the calculation.);
- difference obtaining means for obtaining a difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ("electric power calculating section (4)" [0043]/L19-24 can inherently perform this function. [0066]-[0067] details how said difference affects the operation of electric power generator (101));

- second control means for controlling the amount of electric power consumed by the load portion ("drive motor control section (6)" [0045]); and
- computing means for changing the amount of electric power consumed by the load portion ("demanded drive calculating section (1) performs a calculation for a demanded drive power DP to the drive motor (104)" [0043]/L1-4),

Kazama does not disclose that the second control means controls the amount of electric power consumed by the load portion based on the difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device, or that the computing means changes the amount of electric power consumed by the load portion so as to reduce the difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device.

Tamagawa et al. teaches that it is desirable to control the upper limit of electricity supplied by a battery (upper limit of discharge) for driving a motor in a hybrid system and the upper limit of electricity of the battery charged by the motor (upper limit of charge) [0078]. Controlling the upper limit of charge protects the battery from overcharge [0040]. In order to accomplish this means, the motor controller controls torque to the motor, i.e., the amount of electric power consumed by the load portion, to not exceed the upper limits of the battery [0078].

Kazama and Tamagawa et al. are analogous prior art because both relate to the same field of endeavor, namely, control of hybrid power systems.

It would have been obvious for one of ordinary skill in the art at the time of the invention to use the drive motor control section of Kazama to control the amount of power consumed by the motor, as taught by Tamagawa et al., for purposes of protecting the battery in the circuit from overcharge. Further, it would have been obvious for one of ordinary skill in the art at the time of the invention to use the demanded drive calculating section as taught by Kazama et al. to change the amount of electric power consumed by the load portion so as to reduce the difference, again, for purposes of protecting the battery in the circuit from overcharge.

9. Claim 32 is rejected under 35 U.S.C.103(a) as obvious over Kazama (US 2003/0094816) in view of Okhubo et al. (EP 1 220 413), further in view of Tamagawa et al. (EP 1 220 413).

Regarding claim 32, claim element "computing means for changing" is a means (or step) plus function limitation that invokes 35 U.S.C.112, sixth paragraph. In the instant specification, "computing means for changing" is positively recited as element (17) [0047].

Regarding claim 32, Kazama discloses a hybrid fuel cell system ([0036]/L5-10), comprising:

- a fuel cell (Fig. 1, "electric power generator" (101), [0036]/L6-7, [0037]);
- an electric power storage device ("electric power storage unit" (103), [0037]);
- a load portion which consumes electric power ("vehicle drive motor" (104), [0037]); and
- a control portion which controls an amount of electric power consumed by the load portion ("controller" (105), [0041]/L8-17, [0043]/L1) based on a difference between a supply electric power set value indicating an amount of electric power which needs to be

supplied from the electric power storage device ([0043]/L5-10 "allowable drive electric power output PA of the electric power storage unit (103) *necessary for compensating a delayed response of the electric power generator* with respect to variations in the demanded drive power") and an actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device ([0043]/L12-19 "*available* electric power output PO of the electric power storage unit (103) to be available on the basis of the state of charge of the electric power storage unit (103) which is based on the discharge current BI, the battery charge voltage BV or the like");

Kazama further teaches that information based on the state of charge of the battery is useful [0041]. Specifically, information such as the battery's discharge current can be used in calculation by the controller of the available electric power output of the battery [0043]. Further, overcharge of the battery is a known problem in such hybrid systems and is to be avoided [0086].

Kazama does not disclose

- a filter which removes a noise component contained in the difference between the supply electric power set value indicating the amount of electric power which needs to be supplied from the electric power storage device and the actual supply electric power value indicating an amount of electric power which is actually supplied from the electric power storage device, and which outputs the difference with the noise component removed to the control portion; and

Okhubo et al. teaches a means for accurately determining charging and discharging current of a battery [0014]. Said means involves use of an integrating means or an integrator

[0014], which functions as a low-pass filter. The detected current integrating means integrates the current values that are detected by a current sensor during a period from the instant a battery is fully charged to the instant it is fully charged thereafter [0014]. Because the battery should be charged and discharged by the same amount of current, the integrated value contains offset values that are caused by the current sensor [0014]. The integrated value of the detected current values is divided by the length of the period that is the integration period, thus offsetting any change in values and allowing for accurate and precise measurement of the battery capacity under different load conditions [0014].

Kazama and Okhubo et al. both concern the state of charge of an electrical storage device, i.e., a battery.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an integrating means functioning as a low-pass filter connected to the current sensor of the electrical storage device of Kazama, for purposes of offsetting values caused by the current sensor and accurately and precisely measuring battery capacity under different load conditions (Okhubo et al. [0014]).

Modified Kazama discloses a computing means for changing the amount of electric power consumed by the load ("demanded drive calculating section (1) performs a calculation for a demanded drive power DP to the drive motor (104)" [0043]/L1-4) but does not disclose

- computing means for changing the amount of electric power consumed by the load portion so as to reduce the difference with the noise component removed.

Tamagawa et al. teaches that it is desirable to control the upper limit of electricity supplied by a battery (upper limit of discharge) for driving a motor in a hybrid system and the

upper limit of electricity of the battery charged by the motor (upper limit of charge) [0078]. Controlling the upper limit of charge protects the battery from overcharge [0040]. In order to accomplish this means, the motor controller controls torque to the motor, i.e., the amount of electric power consumed by the load portion, to not exceed the upper limits of the battery [0078].

Modified Kazama and Tamagawa et al. are analogous prior art because both relate to the same field of endeavor, namely, control of hybrid power systems.

It would have been obvious for one of ordinary skill in the art at the time of the invention to use the computing means of modified Kazama to control the amount of power consumed by the motor, as taught by Tamagawa et al., for purposes of protecting the battery in the circuit from overcharge. Further, it would have been obvious for one of ordinary skill in the art at the time of the invention to use the computing means as taught by modified Kazama to change the amount of electric power consumed by the load portion so as to reduce the difference with the noise component removed, again, for purposes of protecting the battery in the circuit from overcharge.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to EMILY NYTKO-LUTZ whose telephone number is (571) 270-1183. The examiner can normally be reached on Monday - Thursday, 7:30 AM to 5:00 PM, alternate Fridays 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571) 272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EAN/

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 4133